Simplification of the Calculated Formulas for the Estimation of Statistical Weight

SOV/56-36-4-50/70

$$W_N^{(1)} = -\left(\frac{\pi}{2}\right)^{N-1} \frac{(4N-6)!}{(3N-6)!} \frac{E_o^{3N-4}}{(2N-3)!(2N-2)!} \sum_{k=1}^{N} (\nu_k)^2 .$$

There are 5 references, 3 of which are Soviet.

ASSOCIATION: Institut yadernoy fiziki Akademii nauk Kazakhskoy SSR (Institute of Nuclear Physics of the Academy of Sciences, Kazakhskaya SSR)

SUBMITTED: October 24, 1958

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24 (5)
AUTHOR: Granovskiy, Ya. I. SOV/56-37-1-30/64

TITLE: On the Calculation of the Constant of Interaction in the Nonlinear Theory (O vychislenii konstanty vzaimodeystviya v nelineynoy teorii)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959, Vol 37, Nr 1(7), pp 192 - 196 (USSR)

ABSTRACT: The calculation of various physical quantities in the theory with the Lagrangian $L = -\bar{\psi}\gamma_\mu \nabla_\mu \psi + \frac{1}{2} l^2 \sum_n C_n N(\bar{\psi} O_n \psi, \bar{\psi} O_n \psi)$ requires knowledge of the interaction constant. There are various methods for its determination: from meson-nucleon interaction, from the mass of the pion, etc. In the present paper, it is determined by calculating the nucleon mass. The equation for the Fourier amplitude of the wave function of the nucleon can be derived in the same way as in the paper by W. Heisenberg, F. Kotrel, and H. Mitter (Ref 3). This equation is rather extensive and is explicitly written down here. All terms in this equation result from the calculation of spurs. The course of calculation is observed step by step. The Lagrangian function written at the beginning is not the only one possible. Only 3 of the 5 possible

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On the Calculation of the Constant of Interaction in the Nonlinear Theory SOV/56-37-1-30/64

invariants are linearly independent. The amount of the constant $(4\pi/\varkappa 1)^4$ depends considerably on the choice of the amount of $\varkappa$ (which is contained in the propagation function). The values of the constant at $\varkappa = m_p$ are as follows:

Variant	S	V	T	A	P
$(4\pi/\varkappa 1)^2$	2.897	5.078	4.738	7.644	1.665

Thus, the value of the constant $(4\pi/\varkappa 1)^4$ depends considerably on the choice of the value of $\varkappa$ ($\varkappa$ appears in the propagation function). The author thanks Professor W. Heisenberg and Doctor G. Mitter for their attention paid to the present paper, and for the advanced supply of their numerical results. There are 1 table and 5 references, 3 of which are Soviet.

ASSOCIATION: Institut yadernoy fiziki Akademii nauk Kazakhskoy SSR (Institute of Nuclear Physics of the Academy of Sciences, KazakhskayaSSR)

SUBMITTED: February 6, 1959

Card 2/2

24(5)
AUTHOR: Granovskiy, Ya. I. SOV/56-37-2-17/56

TITLE: The Electromagnetic Interaction in Heisenberg's Theory

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959, Vol 37, Nr 2(8), pp 442-451 (USSR)

ABSTRACT: This theory based upon the wave equation

$\gamma_\mu \partial\psi/\partial x_\mu - l^2\psi(\bar{\psi}\psi) = 0$ and upon the exchange function

$S(x) = (2\pi)^{-4} \int e^{iqx} \frac{\varkappa^3}{q^2(q^2+\varkappa^2)} \left[\frac{\varkappa\gamma_\nu q_\nu}{q^2} - i\right] d^4q$ includes forces with a Coulomb-like variation with distance and with the fine structure constant $\alpha \sim 1/267$. This is the first time that the electromagnetic forces are derived from other, more fundamental relationships (Refs 1,2,3). The calculated fine structure constant is characteristically near the experimental one. The author bases this theory upon the following general Lagrangian: $L = \bar{\psi}\gamma_\mu \frac{\partial\psi}{\partial x_\mu} + \frac{1}{2} l^2 \sum_n C_n :\bar{\psi}O_n\psi . \bar{\psi}O_n\psi:$, where the

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colon is indicative of the normal product of the operators and O_n denotes the 16 Dirac matrices: $O_n = 1; \gamma_\mu; \gamma_{\mu\nu} = (i/2)\left[\gamma_\mu, \gamma_\nu\right]; i\gamma_5\gamma_\mu; \gamma_5$, which satisfy the conditions $O_n^+ = O_n$, $\mathrm{Sp} O_m O_n = 4\delta_{mn}$. In this way the objections raised against the fortuitous choice of the Lagrangian by Heisenberg et al. (Refs 1,2,3), and the introduction of the normal product eliminates the so-called vacuum differences (Ref 4) and the indeterminate quantity $S_f(0)$ from the theory. The first section deals with photons and their properties. The wave function of the boson $\varphi_{\alpha\beta}(x,y) = \left\langle 0/T\psi_\alpha(x)\bar{\psi}_\beta(y)|\Phi\right\rangle$ satisfies the equation $\varphi_{\alpha\beta}(x,x) = \int H_{\alpha\varepsilon\eta\beta}(x,u)\ \varphi_{\varepsilon\eta}(u,u)d^4\mu$, which has been derived from the field equation $\gamma_\mu \partial\psi/\partial x_\mu + l^2 \sum_n C_n :O_n\psi.\bar{\psi}O_n\psi: = 0$ according to the Tamm-Dankov-method.

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The Electromagnetic Interaction in Heisenberg's Theory SOV/56-37-2-17/56

The author derives three equations which are more general and accurate than the equations (19) in Heisenberg's paper (Ref 1). One of the two possible types of solutions gives an antisymmetrical tensor of the second order with two independent transversal polarizations. In a mixture of the variants V, A the polarization of the tensor solution may also be longitudinal. The additional solutions with their non-physical properties are all eliminated from the theory. As the vertex operator contains the factor $B_V = C_S - 6C_V + 2C_A - C_P$ it is possible to draw the following general conclusion: the existence of additional solutions in any one of the variants of the Lagrangian results in the absence of an electromagnetic interaction. By means of the propagation function derived by the author it is also possible to calculate the matrix element of scattering. The result obtained in this paper is in agreement with the results obtained by Heisenberg, Kortel, and Mitter (Ref 2). In the third section the vertex operator describing the emission (absorption) of a M-type photon is discussed. It may be written in the form

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$V_M = \langle \Phi' | \varphi_M(x) | \Phi \rangle = \langle \Phi' | \psi_\alpha(x) \Gamma^M_{\beta\alpha} \bar{\psi}_\beta(x) | \Phi \rangle$, where Φ and Φ' denote the states of the nucleon before and after scattering. When a tensorial photon is emitted, vectorial forces are obtained. The fourth and the fifth section cover the corrections to the propagation function of the photon in a chain approximation and the fine structure constant of the electromagnetic interaction. For the latter

$\alpha = \frac{\pi}{9}\left(\frac{\varkappa_1}{4\pi}\right)^8 B_T^2 B_V^2 \left[1 - \frac{1}{2}\left(\frac{\varkappa_1}{4\pi}\right)^2 B_T\right]^{-2}$ is derived. It appears from this paper that the laws governing the electromagnetic forces can be reduced to more fundamental relationships. The electrodynamics based upon Heisenberg's theory in the case of small momenta leads to the ordinary quantum electrodynamical theory with the fine structure constant 1/138. There are 1 figure, 2 tables, and 8 references, 3 of which are Soviet.

The Electromagnetic Interaction in Heisenberg's Theory SOV/56-37-2-17/56

ASSOCIATION: Institut yadernoy fiziki Akademii nauk Kazakhskoy SSR (Institute of Nuclear Physics of the Academy of Sciences of the Kazakhskaya SSR)

SUBMITTED: February 6, 1959

Card 5/5

21 (1)

AUTHOR: Granovskiy, Ya. I. SOV/20-125-6-13/61

TITLE: On the Properties of the K-Meson (O svoystvakh K-mezona)

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 125, Nr 6, pp 1225-1226 (USSR)

ABSTRACT: The properties of the K-meson are at present being experimentally investigated. It is shown in the present article that various properties of the K-meson (as e.g. mass, spin, parity) may already now be deduced from Heisenberg's theory. The author bases on the Lagrangian $L = \bar{\psi}\gamma_\mu \nabla_\mu \psi + \bar{\lambda}\gamma_\mu \nabla_\mu \lambda + l^2(\bar{\psi} O_n \lambda)(\bar{\chi} O_n \psi)$, where the matrices O_n correspond to one of the 5 variants of β-decay. For the wave function of the K-meson $\varphi(x,y) = \langle 0|T\psi(x)\bar{\chi}(y)|\Phi\rangle$ the following equation is obtained in the first approximation of the Tamm-Dankov method by means of a method given by W. Heisenberg (Ref 3):

$$\varphi(x,y) = -\frac{il^2}{8}\int d^4u \left\{ G(x,u) O_n S^{\chi}(u,y) + S^{\psi}(x,u) O_n G(u,y) \right\} \mathrm{Sp} O_n \varphi(u,u).$$

Here G(x,u) denotes the Green function of the Dirac equation

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(without mass); S^{χ} and S^{ψ} - the packets of the fields χ and ψ respectively. By putting $\varphi(x,x) = e^{ip\cdot x}\psi$ (where p denotes the four-momentum of the K-meson) and going over to momentum representation, a linear algebraic equation for ψ is obtained. An explicit expression for ψ is given for the rest system of the K-meson. From this expression it is then possible to deduce also spin and parity of the K-meson. The mass of the K-meson is deduced from the equation $1 = -4\left[A_n C(p^2) + \varepsilon_n p^2 D(p^2)\right]$. The results obtained by solving this equation and the type of the corresponding wave functions are given in a table. In the nonscalar variant of the nonlinear term two types of solutions are possible, which are distinguished from each other by the sign of the number ε_n occurring therein, and thus also by the mass and the character of the wave funotion. The variant of the nonlinear term may be uniquely determined if spin, parity, and mass of the K-meson are known. The results determined by using the scalar variant are the nearest approach to the most probable values S = 0, P = +1, $M_k/M_p = 0.526$.

On the Properties of the K-Meson SOV/20-125-6-13/61

The difference between the calculated and observed mass is $\sim 3\,\%$. In the pseudoscalar vectorial and tensorial variant the existence of the K-meson is impossible. If the Lagrangian $L' = \bar{\psi}\gamma_\mu \nabla_\mu \psi + \bar{\chi}\gamma_\mu \nabla_\mu \chi - l^2(\bar{\psi} 0_n \chi)(\bar{\chi} 0_n \psi)$ is chosen, the K-meson is possible only in the pseudoscalar and vectorial variant. In this case the masses of the components of the isotopic doublets K^+ and K^0 agree. Further precise information concerning the data on the masses of K^+- and K^0-particles will facilitate the solution of the problem of the isotopic structure of the nonlinear term. The author thanks Professor W. Heisenberg and Doctor H. Mitter for supplying the numerical data. There are 1 table and 4 references.

PRESENTED: January 15, 1959, by N. N. Bogolyubov, Academician

SUBMITTED: January 8, 1959

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GRANOVSKIY, Ya. I., Cand Phys-Math Sci -- (diss) "Non-linear theory of elementary particles and the electromagnetic wave." Alma-Ata, 1960. 12 pp; (Kazakhstan State Univ im S. M. Kirov, Physics Faculty); 150 copies; price not given; author indicated on cover; bibliography at end of text; (KL, 17-60, 138)

S/707/60/003/000/013/013
B108/B102

AUTHOR: Granovskiy, Ya. I.

TITLE: Properties of the mesons in the Heisenberg theory

SOURCE: Akademiya nauk Kazakhskoy SSR. Institut yadernoy fiziki. Trudy. v. 3, 1960. Vzaimodeystviye vysokoenergichnykh chastits s atomnymi yadrami, 157 - 163

TEXT: The Heisenberg theory of elementary particles is examined. The isotopic properties of the mesons have hitherto been unexplained since the isotopic properties of the ψ-field have not been considered. Preliminary calculations have shown that in the scalar theory the isotopic properties of ψ lower the mass of the pseudoscalar meson. Such procedure reduced the discrepancies between theory and experiments. It is stated that a Lagrangian of the form $L = \bar{\psi}\gamma_\mu \frac{\partial}{\partial x_\mu}\psi - \frac{1}{2}l^2(\bar{\psi}\psi)(\bar{\psi}\psi)$ cannot be used as the basis to the theory of the strange particles. A modified form, the so called "realistic model", had been suggested by Heisenberg (Ref. 1, see below). The author calculated this model and found a good agreement with the experiment for K mesons (about 3 % for the mass). For

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pions, however, the discrepancy between experimental and theoretical mass was about 20 %. A more detailed treatment of the isotopic properties of mesons is given in another paper by the author (DAN SSSR, 125, no. 6, 1959). Professor W. Heisenberg and Doctor H. Mitter are thanked for supplying many data, Academician Zh. S. Takibayev for assistance, and I. Golyak for help in the calculations. There are 5 references: 1 Soviet and 4 non-Soviet. The three references to English-language publications read as follows: Ref. 1: W. Heisenberg. Rev. Mod. Phys., 29, 269, 1957; E. Fermi, C. N. Jang. Phys. Rev., 76, 1739, 1949; G. C. Wick. Phys. Rev., 80, 268, 1950.

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S/056/61/040/001/020/037
B102/B204

24.6100

AUTHORS: Granovskiy, Ya. I., Kopylov, G. I.

TITLE: Estimate of the part played by the theorem of conservation of momentum in the statistical theory of particle production

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 40, no. 1, 1961, 180-182

TEXT: In papers on the statistical theory of the multiple production of particles, the opinion has repeatedly been voiced that the anisotropy in angular distribution is a consequence of the fact that the theorem of conservation of angular momentum is not applied to such events, that, in fact, particles in the final state have the same angular momentum as in the initial state. This opinion is shown to be not quite justified. For the most simple classical case of a conservation of the z component of the angular momentum during multiple meson production, the problem is investigated as to the extent to which the statistical theory is influenced. It is found that consideration of conservation of the angular momentum practically does not

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change the statistical theory. The anisotropy thereby caused in angular distribution is considerably less than the one observed. In detail, the studies (see also Refs. 4-6) yielded the following results: 1) The statistical weights after normalization differ only little from the corresponding quantities of the statistical Fermi theory, so that multiplicity practically does not change (instead of $\bar{n}_s = 3.68$ one obtains 3.70). This refers also to the momentum distribution. As soon as the energy approaches the reaction threshold, the cross section decreases more slowly than according to the Fermi theory. 2) The anisotropy in angular distribution decreases with increasing number of particles. If the anisotropy is characterized by ratios between the numbers of particles moving with the same solid angles ($0^\circ \leq \vartheta \leq 60^\circ$ and $60^\circ \leq \vartheta \leq 90^\circ$), it is for 2,3,4... secondary particles equal to 2.5, 1.29, 1.22,...; 3) Also the correlative angular distribution among the particles hardly changes. However, the following interesting fact was established: The mean value of the angle $\bar{\vartheta}_{ik}$ coincides with the mean value of the angle $\bar{\varphi}_{ik}$ in the target plane; both depend only on multiplicity. The coincidence effect occurs also in the Fermi model

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S/056/61/040/001/020/037
B102/B204

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There are 7 Soviet-bloc references.

ASSOCIATION: Institut yadernoy fiziki Akademii nauk Kazakhskoy SSR (Institute of Nuclear Physics, Academy of Sciences Kazakhskaya SSR)

SUBMITTED: July 4, 1960

X

Card 3/3

S/056/61/040/002/025/047
B102/B201

AUTHORS: Granovskiy, Ya. I., Starikov, V. N.

TITLE: Determination of the parity of strange particles with the aid of dispersion relations

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 40, no. 2, 1961, 537-545

TEXT: The methods generally applied to determine the parities of strange particles, which are based upon a phenomenological analysis of their production or absorption, respectively, involve considerable difficulties; above all, to be able to determine the parity of a particle, one must know the nuclear interaction properties of the partner particle, which fact, however, occurs very rarely. The possibility of using the dispersion relations for determining the parity of strange particles has already been reported about by P. T. Matthews and A. Salam (Phys. Rev. 110, 565, 1958), R. Igi (Progr. Theor. Phys. 19, 238, 1958), and C. Goebel (Phys. Rev. 110, 572, 1958). The method is essentially based upon the fact

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that the sign of the pole term appearing in consequence of a transition into an intermediate state containing one hyperon, depends on the parity of the Kp system with respect to this hyperon (See Ref. 2: Phys. Rev. Lett. 2, 510, 1959; Phys. Rev. 113, 1635 and 1692, 1959; Nuovo Cim. 13, 224, 1959 and 15, 986, 1960). To calculate the pole terms one must know the dispersion integral and the real part of the scattering amplitude, which is possible when availing oneself of experimental data. Unlike other investigations (e.g., Ref. 2), the present study was not been conducted with the simplest approximations with respect to $\sigma(E)$, but a complete analysis of all data has been made with the least squares method. The accuracy of calculations can thus be estimated, and a number of problems arising in Ref. 2 (Nuovo Cim.-papers) can be solved. The first part of the present paper contains a discussion of the analysis of experimental data; the data concerned are taken from a lecture by L. Alvarez in Kiyev (KN interaction). These numerical data are presented in Fig. 1 and Table 1, and Fig. 2 and Table 2, respectively. For the study of $\sigma(\omega) = \sum_{k=1}^{n} C_k \varphi_k(\omega)$, the interpolation

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interval is divided into two parts ($m \leq \omega \leq 1.1$ m; $1.1\ m \leq \omega \leq 5$ m); here, as in the whole of the following paper, energy is expressed in rest-mass units of the K^- meson (m = 494 Mev). In the first part, $\sigma^-_{tot} = \sigma^-_{scat} + \sigma^-_{absorp}$ and $\sigma^-_{scat} = 90 \pm 17$ mb, $|k|\sigma^-_{abs} = (7\pm1)\ m^{-1}$. The smoothed σ^-_{tot} curve is employed in the second part (Table 2). Since no cross section values are known for $\omega > 5$ m, it is assumed that $\sigma^-_{tot} = \sigma^+_{tot}$, which, while not at all fitting the experimental data at $\omega = 5$ m, is accurate within 5% at higher energies. The choice of dispersion relations is discussed in the second section of the paper. The dispersion relations offered by Matthews and Salam for the K^-p scattering with the threshold energies $\omega_{\Lambda\pi} = 0.474$ m, $\omega_{\Sigma\pi} = 0.129$ m, and $\omega_{\Sigma} = 0.320$ m, are given in a form that better converges at large ω', and formula

$$D_-(\omega) - D_+(\omega) = B_-(\omega) - B_+(\omega) + \frac{2\omega}{4\pi^2}\int_m^\infty \frac{\sigma_- - \sigma_+}{\omega'^2 - \omega^2}\, k'd\omega' + \frac{2\omega}{\pi}\int_{\omega_{\Lambda\pi}}^{m} \frac{A_-d\omega'}{\omega'^2 - \omega^2} \quad (3.6)$$

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is obtained (according to Matthews-Salam); according to Igi:

$$D_+(\omega)-\frac{\omega+m}{2m}D_+(m)+\frac{\omega-m}{2m}D_-(\omega)=\frac{k^2}{4\pi^2}\int_m^\infty\frac{d\omega'}{k'}\left[\frac{\sigma_+}{\omega'-\omega}+\frac{\sigma_-}{\omega'+\omega}\right]+$$

$$+\frac{k^2}{\pi}\int_{\omega_{\Lambda\pi}}^m\frac{A_-d\omega'}{k'^2(\omega'+\omega)}+2F\frac{k^2}{\omega} \qquad (3.7)$$

and according to Amati (Ref. 2):

$$\frac{D_+(\omega)-D_+(m)}{\omega-m}=\frac{B_+(\omega)-B_+(m)}{\omega-m}+$$

$$+\frac{1}{4\pi^2}\int_m^\infty k'd\omega'\left[\frac{\sigma_+}{(\omega'-\omega)(\omega'-m)}-\frac{\sigma_-}{(\omega'+\omega)(\omega'+m)}\right]-\frac{1}{\pi}\int_{\omega_{\Lambda\pi}}^m\frac{A_-d\omega'}{(\omega'+\omega)(\omega'+m)} \qquad (3.8).$$

(3.6) and (3.7) are applied at $\omega = m$, (3.8) at $\omega = 1.22\ m$. The

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scattering lengths a, b are introduced: $D_+(\omega) = -ak/k_c$ and $D_-(\omega) = \pm bk/k_c$ (k_c being the momentum in the c.m.s.), and formulas

$$\pm b + a = B_1 + \frac{M}{M+m}\frac{2m}{4\pi^2}\left[\int_m^\infty \frac{\sigma_- - \sigma_+}{k'}\,d\omega' + \int_{\omega_{\Lambda\pi}}^m \frac{|k'|\sigma_{ab}^-\,d\omega'}{\omega'^2 - m^2}\right], \quad (3.10)$$

$$\pm b + a + \frac{2Mm}{M+m}\,D_+'(m) = B_2 + \frac{M}{M+m}\frac{m^2}{\pi^2}\left[\int_m^\infty \frac{d\omega'}{k'}\left(\frac{\sigma_+}{\omega'-m} + \frac{\sigma_-}{\omega'+m}\right) + \right.$$

$$\left. + \int_{\omega_{\Lambda\pi}}^m \frac{|k'|\sigma_{ab}^-\,d\omega'}{k'^2(\omega'+m)}\right], \quad (3.11)$$

$$r_+(1{,}22m) = B_3 + \frac{1}{\pi}\int_m^\infty k'\,d\omega'\left[\frac{\sigma_+}{(\omega'-1{,}22m)(\omega'-m)} - \frac{\sigma_-}{(\omega'+1{,}22m)(\omega'+m)}\right] -$$

$$- \frac{1}{\pi}\int_{\omega_{\Lambda\pi}}^m \frac{|k'|\sigma_{ab}^-\,d\omega'}{(\omega'+1{,}22m)(\omega'+m)}. \quad (3.12)$$

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are obtained. The fourth part deals with the calculation of the pole terms; the latter can be determined by the dispersion relations (3.10)-(3.12), and can be expressed by a, b and the dispersion integrals. Numerically one obtains: $a = (0.8389 \pm 0.0268)\ m^{-1}$, and $b = (2.046 \pm 0.330)\ m^{-1}$, $D'_+(m) = (-0.26 \pm 1.65)\ m^{-2}$, $r_+ = (-0.22 \pm 1.04)\ m^{-2}$. The dispersion integrals are subdivided after the four integration intervals $\omega_{\Lambda\pi} \leq \omega' \leq m$, $m \leq \omega' \leq 1.1\ m$, $1.1\ m \leq \omega' \leq 5\ m$, $5\ m \leq \omega' \leq \infty$. $b^-_{tot} = b^+_{tot} = 13 \pm 1$ mb is put for the last interval. The pole terms B_i can be determined by

$$B_i = \bar{B}_i + \sum_{k=1}^{10} b_{ik} \Delta C_k, \tag{4.8}$$

$$\overline{\Delta C_k} = 0, \qquad \overline{\Delta C_k \Delta C_l} = \delta_{kl} D(C_k), \tag{4.9}$$

$$b_{ik} = \begin{pmatrix} 0{,}078 & -0{,}106 & 0{,}182 & -0{,}039 & 0{,}025 & -0{,}006 & 0{,}010 & 0{,}030 & & 0 \\ & & & & & & -0{,}029 & 0{,}036 & & \\ 1{,}773 & -4{,}034 & 6{,}362 & -0{,}025 & 0{,}024 & -0{,}017 & 0{,}010 & 0{,}037 & -0{,}008 & -0{,}009 \\ & & & & & & -0{,}029 & 0{,}043 & & \\ 0{,}642 & -3{,}295 & 7{,}213 & 0{,}123 & -0{,}008 & -0{,}104 & -0{,}002 & 0{,}057 & -0{,}001 & -0{,}031 \end{pmatrix}. \tag{4.10}$$

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(4.10);

their numerical values are given in Table 4 for i = 1, 2, 3. Table 3 contains the same terms, expressed by the (unknown) parities and the coupling constants of the strange particles. By combining the data of these tables, one obtains (Table 3) the relation $a_{\Lambda} g^2_{\Lambda}/4\pi +$ $+ a_{\Sigma} g^2_{\Sigma}/4\pi = B$; the coefficients a_Y can be taken from Table 3. They are a function of the parity. B (cf. Table 4) also depends on the sign of the potential of the $\bar{K}p$ interaction. Not only one, but all dispersion relations are considered and regarded as a system of equations treated with respect to the unknown coupling

i	$a_{i\Lambda}$	$a_{i\Sigma}$
1	-2.296 0.123	-2.717 0.114
2	-2.663 0.143	-2.697 0.113
3	-9.305 0.498	-7.540 0.316

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constants. One obtains

$$a_{1\Lambda}g_\Lambda^2/4\pi + a_{1\Sigma}g_\Sigma^2/4\pi = B_1, \qquad a_{2\Lambda}g_\Lambda^2/4\pi + a_{2\Sigma}g_\Sigma^2/4\pi = B_2,$$
$$a_{3\Lambda}g_\Lambda^2/4\pi + a_{3\Sigma}g_\Sigma^2/4\pi = B_3. \tag{5.2}$$

where

$$\begin{vmatrix} a_{1\Lambda} & a_{1\Sigma} & B_1 \\ a_{2\Lambda} & a_{2\Sigma} & B_2 \\ a_{3\Lambda} & a_{3\Sigma} & B_3 \end{vmatrix} = 0 \tag{5.3}$$

holds. (5.2) is only positively solvable, if the parities are chosen as follows: $p(K^+\Lambda_0) > 0$, $p(K^+\Sigma_0) < 0$. Here, the coupling constants are $g_\Lambda^2/4\pi = 0.28 \pm 0.67$ and $g_\Sigma^2/4\pi = 12.7 \pm 13.6$. The proportionality factor is found to be $k = (\omega_\Sigma + M + M_\Sigma)/(\omega_\Sigma + M - M_\Sigma) = -23.9$.
Summing up: 1) When determining the parities it is not sufficient to

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use the sign of the pole term only (as has been done in Refs. 1, 2), but the dispersion relations must be taken as equations for g_Y^2.

2) Opposed parity of the hyperons is most probable, with the g_Y^2 differing by about the 40-fold. 3) No assumptions must be made concerning the scattering lengths of the K^- meson. 4) The dispersion relation by Igi leads to a large spread of the quantities investigated. 5) The contribution made by absorption is small in the dispersion integrals, with extrapolations being facilitated in the nonphysical region.

Professor Zh. S. Takibayev is thanked for his interest, and Professor L. Alvarez and A. Rosenfeld for having supplied unpublished papers, A. Akhmedshina for her assistance in the calculations. There are 2 figures, 4 tables, and 7 references: 2 Soviet-bloc and 5 non-Soviet-bloc.

ASSOCIATION: Institut yadernoy fiziki Akademii nauk Kazakhskoy SSR (Institute of Nuclear Physics, Academy of Sciences, Kazakhskaya SSR)

S/056/62/043/002/024/053
B104/B108

AUTHORS: Cranovskiy, Ya. I., Starikov, V. N.

TITLE: Determination of the parity and coupling constant of a Σ-hyperon with K-mesons

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 43, no. 2(8), 1962, 525-529

TEXT: With the aid of experimental data on the K-meson scattering from neutrons and the dispersion relations

$$D_-(\omega) = B_-(\omega) + \frac{1}{\pi}\int_{\omega_\Lambda}^{\infty} \frac{A^{(-)}(\omega')\,d\omega'}{\omega' - \omega} + \frac{1}{\pi}\int_{K}^{\infty} \frac{A^{(+)}(\omega')\,d\omega'}{\omega' + \omega}, \qquad (2.1)$$

$$D(\omega) = \mathrm{Re}\,M(\omega), \qquad A(\omega) = \mathrm{Im}\,M(\omega), \qquad (2.2)$$

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for the forward scattering of K^- mesons from a nucleon (Ya. I. Granovskiy et al., ZhETF, 40, 537, 1961) it is shown that the parity of the Σ-hyperon $f_\Sigma^2 = -0.5 \pm 0.22$ is negative and the coupling constant $g_\Sigma^2/4\pi = 10 \pm 4$. The parity of the Λ-hyperon is determined using the new coupling constant and the relations of P. T. Matthews et al. (Phys. Rev., 110, 569, 1958) and of C. Goebel (Phys. Rev., 110, 572, 1958). It is found to be $f_\Lambda^2 = -0.04 \pm 0.40$. f_Λ^2, thus being negative with a probability of 54% and positive with a probability of 46%. The determination of the parity of the Λ-hyperon requires more exact experimental data. There is 1 figure.

ASSOCIATION: Institut yadernoy fiziki Akademii nauk Kazakhskoy SSR
(Institute of Nuclear Physics of the Academy of Sciences Kazakhskaya SSR)

SUBMITTED: February 13, 1962

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S/056/62/043/005/020/058
B102/B104

AUTHORS: Granovskiy, Ya. I., Pantyushin, A. A.

TITLE: Resonance interactions of K mesons

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 43, no. 5(11), 1962, 1684-1687

TEXT: The resonance behavior of a Kπ system which is characteristic of strong interaction is investigated and the effects in the strange-particle physics caused by Kπ resonance are considered for the following characteristics of Kπ resonance:

$$M = 885 \pm 3 \text{ MeV}, \quad \Gamma = 16 \pm 3 \text{ MeV}, \quad T = 1/2, \quad J = 1, \quad P = P_K, \quad S = -1. \tag{1}$$

The narrow resonance is attributed to the K^* meson for which $\langle K\pi/K^* \rangle = \lambda e_\mu (p_K - p_\pi)_\mu$ where e_μ is the pseudovector of K^* polarization and λ is defined by $\lambda^2/4\pi = 1.26 \pm 0.25$. It is assumed that processes as $\bar{K}N \to \bar{K}\pi N$ occur via an intermediate state: $\bar{K}N \to \bar{K}^*N \to \bar{K}\pi N$. It can be shown

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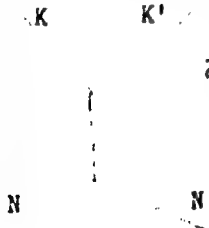
Resonance interactions of K mesons

that in some cases this interaction determines the main features of the strange-particle phenomena. The formation of a K^* meson in $\bar{K}N$ collisions may be assumed to occur according to the graph



. After summing over the K^* polarizations

$$\frac{d\sigma}{dq^2} = f_T \frac{\pi}{4p^2W^2}\left(\frac{\lambda g}{4\pi}\right)^2 \frac{q^2}{(q^2+\mu^2)^2}\left[-4K^2 + \left(\frac{q^2+K^2+K^{*2}}{K^*}\right)^2\right]. \quad (4)$$

is obtained. p and W are momentum and energy in the c. m. s., q is the momentum transferred to the nucleon, g tne πN coupling constant, f_T an isotopic factor; μ, K, and K^* are the masses of the π, K and K^* mesons. The weak dependence of the distribution (4) on q^2, leading to isotropic angular distribution of K^* which is in agreement with experiment (Ref. 1: M. Alston et al. Phys. Rev. Lett., 6, 300, 1961). The total cross section $\sigma = f_T(\lambda^2/4\pi)f(E)$ is calculated for the process $K^- + p \rightarrow K^{*(-)} + p$. With $f_T = 1/5$ and E = 760 Mev $\sigma = (2.1\pm0.5)$mb is obtained which agrees with the

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Resonance interaction of K mesons

result in Ref. 1. At higher energies σ has a plateau at 2.5 mb. For K -meson production in πN collisions, when the nucleon transforms into a hyperon the cross section depends on the parity ratio of K-meson and hyperon. For $P_K P_Y = -1$

$$\frac{d\sigma}{dq^2} = f_T \frac{\pi}{4p^2 W^2}\left(\frac{\lambda g_Y}{4\pi}\right)^2 \frac{q^2 + (Y^{(*)} N)^2}{(q^2 + K^2)^2}\left[-4\mu^2 + \left(\frac{q^2 + \mu^2 + K^{*2}}{K^*}\right)^2\right] \quad (7)$$

where g_Y is the K-meson - baryon coupling constant, Y and N are the masses. In this case the angular distribution of the K-mesons (the decay products of K) is anisotropic with a forward maximum. The total cross section at high energies is

$$\sigma = \sigma_0 = f_T\left(\frac{\lambda^2}{4\pi}\right)\left(\frac{g_Y^2}{4\pi}\right)\frac{\pi}{2K^{*2}} \quad (9),$$

and

$$\sigma(\pi N) / \sigma(\bar{K}N) = (g_\Sigma^2 + 3g_\Lambda^2) / g_N^2. \quad (10).$$

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Resonance interaction of K mesons

σ_K (o) = 1.6 mb and σ_{K^o} = 0.5 mb. For the production of vectorial K" mesons (mass 1.2 Bev) out of π mesons, σ_{lim} 3.2 mb is obtained. The $K^{"(o)}$ and $K^{"(-)}$ production cross section ratio is 2:1. The $K_o\overline{K}_o$ and ππ resonances observed by Powell et al. (Bull. Am. Phys. Soc., 7, 281, 1962) are due to the K" decay products. There are 3 figures.

ASSOCIATION: Institut yadernoy fiziki Akademii nauk Kazakhskoy SSR
(Institute of Nuclear Physics of the Academy of Sciences Kazakhskaya SSR)

SUBMITTED: March 6, 1962

Card 4/4

GRANOVSKIY, Ya.I.; PANTYUSHIN, A.A.; STARIKOV, V.N.

"Threshold" origin of inelastic resonances. Izv. AN Kazakh. SSR. Ser. fiz.-mat.nauk no. 2:48-51 '63. (MIRA 17:6)

L 13642-63 EWT(m)/BDS AFFTC/ASD

ACCESSION NR: AP3003118 S/0056/63/044/006/1896/1900

52
51

AUTHOR: Afonin, A. A.; Granovskiy, Ya. I.

TITLE: Concerning one model of pion-pion interaction 19

SOURCE: Zhurnal eksper. i teor. fiziki, v. 44, no. 6, 1963, 1896-1900

TOPIC TAGS: pion-pion interaction, intermediate vector meson, asymptotic cross section, angular distribution

ABSTRACT: Pion interaction via an intermediate vector meson is considered. The amplitude of pion-pion scattering is determined by making theoretically justified assumption concerning the mass and binding constant of the vector meson. A model is formulated for the description of pion-pion resonance, from which asymptotic values are obtained for the total cross section and the diffraction angular distribution. In this model it is possible to satisfy the main requirements imposed on the scattering amplitude, such as crossing symmetry, unitarity in all channels, etc. The results obtained with this model imply that the P-wave has a resonance accompanied by a Castillejo-Dalitz-Dyson pole (Phys. Rev. 101, 453, 1956), that the asymptotic plot of the cross section has a plateau, satisfies the Pomeranchuk theorem, and is independent of the spin, the angular distribution assumes a diffraction character with increasing energy, and the P-phase has the

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L 13642-63
ACCESSION NR: AP3003118

properties necessary for the description of the nucleon form factor. Reasons for obtaining more precise results are advanced. Orig. art. has 3 figures and 22 formulas.

ASSOCIATION: Institut yadernoy fiziki Akademii nauk Kazakhskoy SSR (Institute of Nuclear Physics, Academy of Sciences, Kazakh SSR)

SUBMITTED: 16Jul62 DATE ACQ: 23Jul63 ENCL: 00

SUB CODE: 00 NO REF SOV: 005 OTHER: 006

Card 2/2

ACCESSION NR: AP4041449 S/0089/64/16/006/0504/0509

AUTHORS: Granovskiy, Ya. I.; Kostritsa, A. A.

TITLE: Nonstationary problems of the kinetic theory of neutron transport

SOURCE: Atomnaya energiya, v. 16, no. 6, 1964, 504-509

TOPIC TAGS: neutron flux, neutron source, neutron transport, kinetic theory, reactor core, reactor moderator

ABSTRACT: In view of the importance that is attached to the derivation of new solutions for the kinetic equation as applied to different individual problems, the authors solve the nonstationary kinetic equation for monoenergetic neutrons by using the Fourier transformation of the unknown function and of the source function, with the initial data taken into account. Such an approach is made possible by the linearity of the neutron transport equation. The diffusion

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ACCESSION NR: AP4041449

of neutrons from a moving source and from an oscillating source is analyzed, and its relation to similar problems in electrodynamics and heat conduction pointed out, in view of its possible application to reactors with moving neutron-source front, moving absorber, or fast-moving moderator. Formulas are given for the dependence of the diffusion length on the source velocity, and the neutron field near the source is analyzed. "The authors are grateful to L. A. Vulis, G. I. Marchuk, and Yu. V. Petrov for interest in the work." Orig. art. has: 47 formulas.

ASSOCIATION: None

SUBMITTED: 14Oct63 ENCL: 00

SUB CODE: NP NR REF SOV: 003 OTHER: 002

Card 2/2

L 4883-66 EWT(m)/T/EWA(m)-2
ACCESSION NR: AP5021150 UR/0386/65/002/001/0045/0048

AUTHOR: Granovskiy, Ya. I.; Pantyushin, A. A.

TITLE: Relativistic generalization of SU(3) symmetry. Baryon current.

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki. Pis'ma v redaktsiyu. Prilozheniye, v. 2, no. 1, 1965, 45-48

TOPIC TAGS: elementary particle, relativistic quantum mechanics, baryon, wave function, particle interaction, magnetic moment

ABSTRACT: The authors point out that although SU(3) symmetry of elementary particles has a natural explanation within the framework of the composite model, based on a triplet of quarks, nevertheless, if particles are constructed from such quarks, no connection whatever is obtained between the unitary and the spin properties. The connection arises only in a theory which treats all the 12 components as equivalent. It is shown that it is possible to choose for the baryon wave function a symmetrical spinor of third rank which has 364 components and this supermultiplet breaks up into SU(3) multiplets with definite values of spin and parity when the moderately-strong interaction is turned on. An expression is derived for the explicit form of such a supermultiplet, whose composition ties in very well with the experimental data and justifies the choice of the baryon wave function. The baryon

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L 4883-66

ACCESSION NR: AP5021150

current is expanded in terms of the system of Dirac matrices with coefficients that are known combinations of wave functions. SU(6) symmetry is shown to be contained in this theory as a limiting case. The electromagnetic current of the baryon octet is then derived and it is shown that in the static limit it agrees with the hypothesis on the octet character of the electromagnetic current. It is thus possible to calculate not only the baryon magnetic moment ratios known from SU(6) symmetry, but also their absolute values, which agree within 5--10% with experiment. Among the results of the theory are equality of the form factors of the proton and vanishing of the form factor of the neutron. The results also confirm that the depth of the neutron-electron interaction well is -4270 ev. The theory applies also to weak current. Orig. art. has: 9 formulas.

ASSOCIATION: Institut yadernoy fiziki Akademii nauk Kazakhskoy SSR (Institute of Nuclear Physics, Academy of Sciences, Kazakh SSR)

SUBMITTED: 25May65 ENCL: 00 SUB CODE: GP, NP

NR REF SOV: 001 OTHER: 007

Card 2/2

GRANOVSKIY, Ya.I.; PANTYUSHIN, A.A.

Derivation of Wien's formula. Izv. vys. ucheb. zav.; fiz. 8 no.3:146 '65. (MIRA 18:9)

1. Institut yadernoy fiziki AN KazSSR.

L 58758-65 EWT(d) IJP(c) DM

ACCESSION NR: AP5012486 UR/0089/65/018/004/0419/0422
621.039.51.12

AUTHORS: Granovskiy, Ya. I.; Kostritsa, A. A. 12 B

TITLE: Asymptotic solution of the kinetic equation and diffusion characteristics 76

SOURCE: Atomnaya energiya, v. 18, no. 4, 1965, 419-422

TOPIC TAGS: diffusion theory, spherical harmonic, asymptotic solution, kinetic equation, Green's function, Fick's law

ABSTRACT: After pointing out that exact solutions of the kinetic equation, which has been investigated only for very simple scattering functions, display properties common to those observed in the P_1-approximation of the method of spherical harmonics, used for diffusion theory, the authors analyze in greater detail the diffusion properties of the asymptotic part of the solution of the kinetic equation in the general case when both the scattering and the sources are

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ACCESSION NR: AP5012486 O

anisotropic. From an analysis of the equation of the diffusion length, with application of Fick's law in neutron transport theory, it is shown that a tight relation exists between the singularities of the asymptotic behavior of the neutron density at large distances and the singularities of the Green's function of the kinetic equation, and that this connection is the cause of the common nature of the properties of the diffusion theory and the solutions of the kinetic equation. Original article has: 39 formulas

ASSOCIATION: None

SUBMITTED: 30Mar64 ENCL: 00 SUB CODE: MA, NP

NR REF SOV: 002 OTHER: 001

Card 2/2

L 12070-66 EWT(m) DIAAP

ACC NR: AP6002658 SOURCE CODE: UR/0368/65/002/012/0549/0551

AUTHOR: Granovskiy, Ya. I.

ORG: Institute of Nuclear Physics, Academy of Sciences KazSSR (Institut yadernoy fiziki Akademii nauk KazSSR)

TITLE: Two axial octets

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki. Pis'ma v redaktsiyu. Prilozheniye, v. 2, no. 12, 1965, 549-551

TOPIC TAGS: elementary particle, strong nuclear interaction, meson, parity principle

ABSTRACT: The author states that the recently discovered nonet of tensor mesons (S. Glashow and R. Socolow, Phys. Rev. Lett. v. 15, 329, 1965)

$$9(2^+) = A_2(1320) + K^{**}(1430) + f(1250) + f'(1525) \quad (1)$$

can fit, within the framework of SU(6) symmetry, only in a supermultiplet of dimensionality 405

$$\underline{405} = \underline{9}(2^+) + \underline{27}(2^+) + \underline{9}(0^+) + \underline{27}(0^+) + \underline{8}(1^+) + \underline{8}(1^+) + \underline{10}(1^+) + \underline{10^*}(1^+) + \underline{27}(1^+) \quad (2)$$

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ACC NR: AP6002658

This 405-plet contains two axial octets, which differ in the G-parity of their non-strange components. The author proposes to identify them with the known resonances in the following fashion:

$$\underline{8}^{(a)} = A_1(1090) + C(1215) + E(1410),$$

$$\underline{8}^{(b)} = B(1215) + C'(1330) + D(1280) \qquad (3)$$

It is shown that such an identification can explain many experimental regularities in the masses, mixing, angles, and widths. It is deduced from the analysis that the greater part of the 405-plet has already been observed and most data favor its actual existence. Orig. art. has: 10 formulas.

SUB CODE: 20/ SUBM DATE: 30Oct65/ OTH REF: 002

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GRANOVSKIY, Ya.I.

Two axial octets. Pis'. v red. Zhur. eksper. i teoret. fiz. 2 no.12:549-551 D '65. (MIRA 19:1)

1. Institut yedernoy fiziki AN Kazakhskoy SSR. Submitted Oct. 30, 1965.

GRANOVSKIY, Ya.L.

Contribution by metallurgists to the success of the seven-year plan. Metallurg 5 no.3:36-37 Mr '60. (MIRA 13:7)

1. Instruktor TSentral'nogo Soveta Vsesoyuznogo obshchestva izobretateley i ratsionalizatorov.
(Steel—Metallurgy)

0.0000

78052
SOV/130-60-3-21/23

AUTHOR: Granovskiy, Ya. L. (Instructor)

TITLE: Contribution by Metallurgists Into the Fund of Seven-Year Plan

PERIODICAL: Metallurg, 1960, Nr 3, pp 38-39 (USSR)

ABSTRACT: This article describes contribution by metallurgists for the over-fulfillment of quotas and production economy measures of the seven-year plan. All workers in the metallurgical industry are innovating techniques for automation and speed-up of production, at the same time reducing production costs. The 1960 plan calls for an increase in output of cast iron by 9%, steel by 8%, rolling by 7%, and piping by 12%. At metallurgical combine imeni A. K. Serov (metallurgicheskiy kombinat imeni A. K. Serova) the inventors and innovators have pledged to reduce the seven-year plan expenditure by 100,000,000 rubles. Using newly developed methods the plant reduced the 1958 production costs by 10,175,000 rubles and in seven months of 1959 achieved an economy

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of 9,500,000 rubles. In eight months of 1959 the inventors and innovators have not only completed their annual quota, but also have contributed 1,500,000 rubles toward the 1960 quota. At Pervoural'sk new pipe plant (Pervoural'skiy novotrubniy zavod) both inventors and innovators undertook to complete the 1960 quota by the 42nd anniversary date of the October revolution. At the Verkh-Iset' metallurgical plant (Verkh-Isetskiy metallurgicheskiy zavod), a complex brigade led by Lifshitsin innovated reconstruction of the electric vacuum furnaces, which will result in economy of 2,500,000 rubles. The Council of All-Union Society of Inventors and Innovators (Soviet vsesoyuznogo obshchestva izobretateley i ratsionalistov, VOIR) headed by Maslennikov is organizing contests, reviewing innovations, and analyzing individual productivity through plant newspapers, films, and plant tours.

Contribution by Metallurgists Into the Fund of Seven-Year Plan

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SOV/130-60-3-21/23

At Izhevsk metallurgical plant (Izhevskiy metallurgicheskiy zavod), an engineer Tverdokhleb solved a mechanization problem that would save the plant 250,000 rubles. Savel'yev, the general manager of the same plant, suggested that new elongated ingots be cast, thus increasing blooming production by 20%; through resulting conservation of fuel and electric power, production costs will be cut by 2,500,000 rubles. The process has now been adopted by 17 plants. A total of 1,500 innovations resulted in an economy of 12,000,000 rubles. The complex brigade, including Lanin, Babushkin, Drozdov, and others suggested new heating rates for the furnace of rolling mill 450, saving 2,000,000 rubles, due to fuel consumption decrease. The innovators have pledged to reduce seven-year plan cost by 125,000,000 rubles and to promote plant automation and mechanization to a maximum. At Magnitogorsk metallurgical combine (Magnitogorskiy metallurgicheskiy zavod) the blast

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furnace operators pledged to reduce seven-year plan costs by 20,000,000 rubles. In 1959 the innovators of blast furnace units undertook to introduce 120 innovations with a saving of 3,000,000 rubles. The complex brigade of innovators consisting of Vlasov, Shibayev, Belikov, and others developed a ladle transportation method resulting in an economy of 1,000,000 rubles. At Kuznetsk metallurgical plant imeni Stalin (Kuznetskiy metallurgicheskiy zavod imeni Stalina), the steelworkers of sheet rolling mill Cheremukhin, assisted by Churinov, assistant supervisor of Inspection Department (OTK), Monastyrskiy, chief of the electromelting shop, Glazov, locksmith of the Central Plant Laboratory (TsZL), Vyalove, senior foreman of the railroad unit, Krupkin, and many others, have contributed successful innovations. At Kosogorsk metallurgical plant (Kosogorskiy metallurgicheskiy zavod), Ksendz, a melter, introduced a method of remelting chips,

resulting in an economy of 250,000 rubles. At Nizhniy-Tagil metallurgical plant (Nizhne-Tagil'skiy metallurgicheskiy zavod), the innovators are introducing new automation methods. The central committee of professional union of the workers of metallurgical industry and the Central Council of VOIR, held a meeting on Nov. 17, 1959, during which a joint decision was made on a review on mass inventions and innovations offered by labor and on attraction of engineers and technicians to a fuller participation in reviewing practices.

ASSOCIATION: Central Council of All-Union Society of Inventors and Innovators (Tsentral'nyy Sovet VOIR)

GRANOVSKIY, YA.L.

S/130/60/000/007/003/003

AUTHORS: Granovskiy, Ya. L., Instructor

TITLE: A Valuable Initiative

PERIODICAL: Metallurg, 1960, No. 7 pp. 35

TEXT: The State Commitee of the USSR Council of Ministers on Automation and Machinebuilding has decided to convert the Pervoural'skiy novotrubnyy zavod (Pervoural'sk New Pipe Plant) into an experimental model enterprise of the pipe industry. This resolution sets up a responsible task before the workers of this plant. Under the leadership of Master V. G. Terekhin a large-scale competition program on the reduction of costs was developed. The engineering and technical staff committed themselves to achieve by the introduction of inventions a yearly economy equalling their annual wages. For this purpose, first in the Sverdlovsk oblast', public designing offices (obshchestvennyye konstruktorskiye byuro) - the OKB - were created for the development and introduction of new measures and innovations in the reconstruction, mechanization and automation of equipment and of the technology. The OKB's drew-up plans of their work including the development of organizational and technical measures and innovation projects. These plans were transmitted to the department of

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organization of labor. During the first 3 months of 1960 the OKB's carried out 75 studies; 55 new suggestions were developed and 46 of them were introduced into the production providing for a saving of 2,166,000 rubles. The remaining 9 projects are now being tested. During the second quarter 1960, 23 innovation suggestions were made, whose introduction will ensure a saving of 370,000 rubles. Ya. F. Rayt, A. M. Pyshnoy, F. F. Kasimov and S. M. Dmitriev, designers of the drawing shop, developed a design for the reconstruction of a cold pipe-drawing mill ensuring the simultaneous drawing of two pipes. Presently, 17 public designing offices operate at the main shops and departments of the plant, their personnel includes 350 engineers, technicians, masters and innovators. A group of designers of Shop No. 4 developed under the supervision of A. A. Shapkin a new method of forging 63.5 x 6 mm rods on a small-size forging machine. A team of the same shop headed by M. Ya. Grabarnik, rebuilt the tachogenerator drums of the "140 No. 3" mill. M. G. Yefremov, V. P. Opalev, Ye. M. Tsedilkin and others, belonging to the OKB of Shop No. 1, developed a design of a five-high rolling mill mounted on the finishing stand of a rack mill. It is intended to develop 156 innovation measures, including stainless steel pipe drawing on an "aksalot" coating, improvement of the automatic control system of the ХПТ-55 (KhPT-55) mill, painting of containers in an electrostatic field etc. The factory council

A Valuable Initiative

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of the All-Union Society of Inventors and Efficiency Experts pays great attention to the work of the OKB. A meeting of OKB engineers and technicians was organized at which A. M. Zvyagintsev, Chief Engineer of the plant reported on the development of the OKB and the technical progress. A comprehensive plan on the intensification of the technical progress in 1959-65, has been approved and put into operation surpassing by 21% and 33% respectively, pipe and container production originally set up in the Seven-Year-Plan. The introduction of the developed technological measures will liberate 2,500 workers from labor-consuming operations and the total annual economy will amount to over 170 million rubles. The establishment of OKB offices with the assistance of VOIR in all Soviet enterprises is recommended.

ASSOCIATION: Tsentral'nyy Soviet VOIR (Central Council of VOIR)

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GRANOVSKIY, Ya.L.

Contribution on the part of innovators to the fulfillment of the seven-year plan. TSvet.met. 33 no.5:83 My '60. (MIRA 13:7)

1. Instruktor TSentral'nogo Soveta Vsesoyuznogo obshchestva izobretateley i ratsionalizatorov.
(Nonferrous metal industries--Equipment and supplies)

- GRANOVSKIY, Ya.L.

Introduce all that is useful and progressive. Metallurg 6 no.5: 36-37 My '61. (MIRA 14:5)

1. TSentral'nyy sovet Vsesoyuznoye obshchestvo izobretateley i ratsionalizatorov.
(Chusovoy--Metallurgical plants)

DAVYDOVA, Anna Mikhaylovna; GRANOVSKIY, Yakov Leonidovich;

[Collection of materials in aid of the organizational units of the All-Union Society of Inventors and Rationalizers] Sbornik materialov v pomoshch' organizatsiiam VOIR. Moskva, TSentr. nauchno-issl. in-t patentnoi informatsii i tekhniko-ekon. issl., 1963. 187 p. (MIRA 17:7)

1. Vsesoyuznoye obshchestvo izobretateley i ratsionalizatorov. TSentral'nyy Sovet.

GRANOVSKIY, Ya. V.

Granovskiy, Ya. V. "The economic efficiency of the use of plasma. cavacities", Gidroliz. prom-st' SSSR, 1948, No. 6, p. 18-19.

So: U-3271, 10 April 53, (Letopis 'Zhurnal 'nykh Statey, No. 12, 1949).

GRANOVSKIY, Ye.

The department of labor and wages in machine-building factories.
Sots.trud. no.5:28-35 My '56. (MLRA 9:8)
(Industrial organization)

GRANOVSKIY, Ye. [Hranovs'kyi, E.]

"Clever" traffic signal. Znan.ta pratsia no.1:31 Ja '60.
(MIRA 13:5)

(Traffic signs and signals)

GRANOVSKIY, Ye.; NEDOREZOV, P.

Renew norms for technical standards systematically. Sots.trud 5 no.4:106-107 Ap '60. (MIRA 13:9)
(Machinery industry--Production standards)

GRANOVSKIY, Ye.; NEVOL'SKIY, G.

Improve the organization of work planning and wages. Mashinostroitel' no.7:40-41 Jl '62. (MIRA 15:7)
(Factory management)

GRANOVSKIY, Ye.; REDEL'MAN, A.

Improve the establishment of work norms and planning of conveying work. Sots. trud 7 no.10:86-93 O '62. (MIRA 15:10)

(Machinery industry—Production standards)
(Material handling)

L 5378-66 EWT(m)/EWA(d)/T/EWP(t)/EWP(k)/EWP(z)/EWP(b)/EWA(c) IJP(c)

ACC NR: AP5027100 MJW/JD/HW UR/0149/65/000/005/0128/0130
669.715

AUTHOR: Vaynblat, Yu. M.; Gorelik, S. S.; Granovskiy, Ye. B.

TITLE: Effect of heat treatment on certain properties and structure of the hot-pressed aluminum alloy AMg6

SOURCE: IVUZ. Tsvetnaya metallurgiya, no. 5, 1965, 128-130

TOPIC TAGS: metal heat treatment, metal pressing, aluminum alloy, crystal orientation

ABSTRACT: Heat treatment (hardening + aging) of certain hot-pressed Al alloys markedly increases the ultimate strength and yield strength of the products fabricated from these alloys, in the direction of pressing as well as to a smaller extent, in the transverse direction. The attendant difference in longitudinal and transverse properties is often termed the pressing effect. Gorelik et al. (Metallovedeniye i termoobrabotka, no. 12, 48 (1962) in their study of avial show that the pressing effect is attributable to the oriented distribution of the excess phase in the α-solid solution of Mg or Mn in Al, which hardens the alloy and impedes the processes of recrystallization. Accordingly, the applicability of this theory is tested in the

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L 5378-66

ACC NR: AP5027100

present investigation with respect to the AMg6 aluminum alloy. Rods of AMg6, pressed under industrial conditions, were heat-treated (heating to 450°C for 0.5 hr, cooling in water) and aged (heating to 150°C for 16 hr). Mechanical properties and their anisotropy in the rods were investigated following every individual stage of this treatment, in specimens cut out parallel and counter to the direction of the pressing. It was thus established that the anisotropy of mechanical properties following pressing and heat treatment is greater than following pressing alone. Radiometallographic phase analysis indicates that the specimens after pressing contain a number of phases in addition to the solid solution. The phase Mg_2Al_3, which disappears after hardening and reappears on aging, is the most distinctly expressed. Following aging, the textural maxima on the phase lines are disposed at virtually the same angles as the maxima of the solid-solution lines corresponding to closely adjoining planes. This confirms the dependence of phase orientation on matrix texture, which indicates that the anisotropy of mechanical properties in the AMg6 alloy is chiefly conditioned by the oriented segregations of the disperse phase in the textured matrix. Orig. art. has: 1 figure, 2 tables.

ASSOCIATION: Moskovskiy institut stali i splavov. Katedra materialovedeniya poluprovodnikov (Moscow Institute of Steel and Alloys, Dept for Material Science of Semiconductors)

SUBMITTED: 10Oct64 ENCL: 00 SUB CODE: MM, SS

NO REF SOV: 003 OTHER: 002

Card 2/2

ACCESSION NR: AP4028437 S/0181/64/006/004/1100/1103

AUTHORS: Semenovskaya, S. V.; Umanskiy, Ya. S.; Puzey, I. M.; Granovskiy, Ye. B.

TITLE: Investigating the phonon spectrum of nickel by diffuse scattering of x rays

SOURCE: Fizika tverdogo tela, v. 6, no. 4, 1964, 1100-1103

TOPIC TAGS: phonon, nickel, diffuse scattering, x ray, elastic wave, sound velocity, elastic constant, ferromagnetic property, multiphonon scattering, goniometer RKSO, ionizer URS 50 IM, counter MST 17

ABSTRACT: The authors determined the dependence of frequency on the wave vector for longitudinal and transverse waves propagated along the symmetry directions—[100], [110], and [111] at room temperature. The initial segments of the dispersion curves permit approximate determination of the velocity of sound. The velocities thus obtained agree with average values determined ultrasonically within 7% or less. The computed values of the elastic constants (in dynes/cm^2)—$2.45 \cdot 10^{-12}$ for c_{11}, $1.6 \cdot 10^{-12}$ for c_{12}, and $1.14 \cdot 10^{-12}$ for c_{44}—are in good agreement with data from the literature. The dispersion in Ni is found to be much

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greater than in Al and Cu, as reported in the literature. This fact apparently derives from the ferromagnetic nature of Ni and is due to spin-phonon interaction. The authors note that the precision in measuring the phonon spectrum is related to the precision in determining multiphonon scattering, and they point out some sources of error in applying corrections for multiphonon scattering. The corrections have a higher degree of validity for Al than for Ni. Orig. art. has: 3 figures and 2 tables.

ASSOCIATION: Moskovskiy institut stali i splavov (Moscow Institute of Steel and Alloys)

SUBMITTED: 23Oct63 DATE ACQ: 27Apr64 ENCL: 00

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GAL'TSOV, A.D.; DENISYUK, I.N.; LEVANDOVSKIY, S.N.; LOSEV, A.G.; PEZIK, M.O.; PETROCHENKO, P.F.; SAVOS'KIN, N.M.; TRUBITSKIY, G.R.; KHISIN, R.I.; KHROMILIN, V.A.; ALEKSEYEV, S.S., retsenzent; GAL'PERIN, L.I., retsenzent; GRANOVSKIY, Ye.N., retsenzent; ZAKHAROV, N.N., retsenzent; KVASHNIN, S.A., retsenzent; KEREKESH, V.V., retsenzent; KOTENKO, I.N., retsenzent; LIVSHITS, I.M., retsenzent; LERNER, G.V., retsenzent; NEVSKIY, B.A., retsenzent; NOVIKOV, V.F., retsenzent; RAZAMAT, E.S., retsenzent; SERGEYEV, A.V., retsenzent; STEFANOV, V.P., retsenzent; TOLCHENOV, T.V., retsenzent; FEDOTOV, F.G., retsenzent; VOL'SKIY, V.S., red.; STRUZHESTRAKH, Ye.I., red.; USPENSKIY, Ya.K., red.; SEMENOVA, M.M., red.izd-va; MODEL', B.I., tekhn.red.

[Handbook for work-norm experts in machine manufacture] Spravochnik normirovshchika-mashinostroitelia v 4 tomakh. Moskva, Gos.nauchno-tekhn.izd-vo mashinostroit.lit-ry. Vol.1. [Fundamentals of technical normalization] Osnovy tekhnicheskogo normirovaniia. 1959. 676 p. (MIRA 12:12)

(Standardization)

GRANOVSKIY, Ye. N.; SOTNIKOVA, K.

New book on technical standardization (Technical standardization at a machinery manufacturing plant by M. Shadmazarova). Sots. trud. 4 no.10:155-158 O '59 (MIRA 13:3)
(Machinery industry--Production standards)

GRANOVSKIY, Ye.N.

Problems in establishing technical norms. Mashinostroitel' no.8: 4-5 Ag '61. (MIRA 14:7)
(Machinery industry—Production standards)

BORZYAK, A.F.; KHISIN, R.I., inzh., retsenzent; GRANOVSKIY, Ye.N., inzh., red.; SMIRNOVA, G.V., tekhn. red.

[Establishment of norms and wages for operators of machine tool units] Normirovanie i oplata mnogostanochnykh rabot. Moskva, Mashgiz, 1961. 62 p. (MIRA 15:7)
(Metal cutting---Production standards)
(Wages)

GRANOVSKIY, Ye.N.; NEDOREZOV, P.V.

Consolidated norms for preliminary determination of labor consumption in manufacturing parts. Mashinostroitel' no.11:39-41 N '62. (MIRA 15:12)

(Factory management)

GRANOVSKIY, Ye.N.

Improvement in the establishment of technical norms is an urgent task. Mashinostroitel' no.3:31-32 Mr '65.

(MIRA 18.4)

GRANOVSKIY, Yu.V.

The use of daylight lamps in making blueprints. Torf.prom.32 no.4:31 '55. (MLRA 8:10)

1. Demikhovskiy mashinostroitel'nyy zavod.
(Blueprinting)

S/032/63/029/001/014/022
B104/B186

AUTHORS: Granovskiy, Yu. V., Chernova, N. A., Adler, Yu. P., Nalimov, V. V., Komissarova, L. N., and Spitsyn, Vik. I.

TITLE: A mathematical model for the extractive separation of hafnium and zirconium by tributyl phosphate

PERIODICAL: Zavodskaya laboratoriya, v. 29, no. 1, 1963, 60-65

TEXT: Improvement of the conditions for separating zircon and hafnium from nitric acid solutions using tributyl phosphate is studied by the Box-Wilson method (G. E. Box, K. B. Wilson, J. Roy Stat. Soc. (B), 13, 1 (1951)). The following independent variables were selected: X_1 is the concentration of the metals for the sum of $Zr(Hf)O_2$ (g/l); $\tilde{X}_2$ is the concentration of the acid in the aqueous initial solution (gramm equivalent/liter); $\tilde{X}_3$ is the concentration of the tributyl phosphate in o-xylene (volume-%); $\tilde{X}_4$ is the phase ratio $V_o : V_B$. The optimization parameter is the separation factor y. Different series of experiments

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A mathematical model for the ...

show the appropriate programming matrices with the results. These are used to determine the direction in which the independent variables must be varied. For the separation factor the regression equation

$$y = 13,3478 - 0,1496X_1 + 1,5036X_2 - 0.6393X_3 + 0,2635X_4 + 0,1078X_1^2 - 1,3422X_2^2 - 0.7798X_3^2 + 0,0200X_4^2 - 0,0181X_1X_2 + 0,4756X_1X_3 + 0,6432X_1X_4 - 0,1431X_2X_3 - 0,0506X_3X_4 + 0,1931X_3X_4.$$

is obtained, where $X_i = (\widetilde{X}_i - \widetilde{X}_{io})/\widetilde{X}_{iA}$, $\widetilde{X}_i$ is here the value of the natural variable, $\widetilde{X}_{io}$ and $\widetilde{X}_{iA}$ are the values of the reference point in the phase space and the variation interval. This equation describes the experimental results. By displacement along the coordinate axes X_i, separation factors (22.8 and 28.2) could be obtained which were larger than those hitherto known. Further, the model can be used to compensate

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uncontrolled changes of one or several variables by changing other variables arbitrarily. There are 1 figure and 4 tables.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet i Gosudarstvennyy nauchno-issledovatel'skiy i proyektnyy redkometallicheskoy promyshlennosti
(Moscow State University and State Design and Planning Scientific Research Institute of the Rare Metals Industry)

Card 3/3

S/032/63/029/001/015/022
B104/B186

AUTHORS: Komissarova, L. N., Granovskiy, Yu. V., Prutkova, N. M., Adler, Yu. P., Nalimov, V. V., and Spitsyn, Vik. I.

TITLE: Determination of optimal extraction conditions for microquantities of hafnium using tributyl phosphate

PERIODICAL: Zavodskaya laboratoriya, v. 29, no. 1, 1963, 65-68

TEXT: Optimum conditions for extracting microquantities of hafnium from nitric acid solutions using tributyl phosphate are sought by means of the Box-Williams method (V. V. Nalimov, Uspekhi khimii, 29, 11, 1362 (1960), Zavodskaya laboratoriya, v. 29, no. 1, 1963, 60, G. E. Box, K. B. Wilson, J. Roy Stat. Soc. (B), 13, 1 (1951)). Parameters: X_1 is the concentration of the nitric acid in the aqueous initial solution (N); X_2 is the concentration of tributyl phosphate in o-xylene (volume-percent); X_3 is the phase ratio (V_o : V_B); X_4 is the extraction time (min). The optimization parameter is the hafnium distribution factor y. Working from an arbitrarily

chosen point in the X_i space and using programming matrices with the results of three test series, it is determined how the test conditions must be varied, in order to achieve an optimum distribution factor. In the three series it was possible to obtain distribution factors of 44,0, 160,0 and 303,0 respectively. There are 5 tables.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet i Gosudarstvennyy nauchno-issledovatel'skiy i proyektnyy institut redkometallicheskoy promyshlennosti
(Moscow State University and State Design and Planning Scientific Research Institute of Rare Metals Industry)

S/032/63/029/003/011/020
B112/B186

AUTHORS: Granovskiy, Yu. V., Nikishova, V. V., Adler, Yu. P., Nalimov, V. V., and Komissarova, L. N.

TITLE: Sifting experiments for investigating the extraction of zirconium from tributylphosphate

PERIODICAL: Zavodskaya laboratoriya, v. 29, no. 3, 1963, 321 - 326

TEXT: Those influences which predominatingly affect the process of extraction of zirconium from tributylphosphate are selected by the method of random balance. The following variables are codified: concentration of the metal (A), concentration of the acid (B), concentration of the reagent (C), volume of the restricted phase (D), extraction time (E), revolution velocity of the mixers during extraction (F), volume of the re-extragent (G), number of re-extractions (H), re-extraction time (I), revolution velocity of the mixers during re-extraction (J), time of phase separation after extraction (K), time of phase separation after re-extraction (L). The results of the experiments are represented in the dispersion diagram (Fig. 1). The selection of the predominating effects A, B, C, AB, BC, and CD was obtained under conditions at which 78 effects (12 linear and 66 pair

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interactions) could be of importance. There are 6 figures and 5 tables.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet i Gosudarstvennyy nauchno-issledovatel'skiy i proyektnyy institut redko-metallicheskoy promyshlennosti (Moscow State University and State Scientific Research and Planning Institute of Rare-Metal Industry)

S/032/63/029/003/012/020
B101/B186

AUTHORS: Komissarova, L. N., Granovskiy, Yu. V., Prutkova, N. M., Adler, Yu. P., and Nalimov, V. V.

TITLE: Application of mathematical experimental programming methods to studying the extraction of zirconium

PERIODICAL: Zavodskaya laboratoriya, v. 29, no. 3, 1963, 327 - 330

TEXT: For extracting zirconium by means of tributylphosphate (TBP) three possible reaction equations are written down: $Zr^{4+} + 4NO_3^- + TBP \rightleftharpoons Zr(NO_3)_4 \cdot TBP$; $Zr^{4+} + 4NO_3^- + 2TBP \rightleftharpoons Zr(NO_3)_4 \cdot 2TBP$; $Zr^{4+} + 2H^+ + 4NO_3^- + 2TBP \rightleftharpoons Zr(NO_3)_4 \cdot 2TBP + H_2O$. The equations for the apparent extraction constants $\tilde{K}_e$ are linearized to: $\log D = \log \tilde{K}_{e_1} + 4 \log X_H + \log T$; $\log D = \log \tilde{K}_{e_2} + 4 \log X_H + 2 \log T$; $\log D = \log \tilde{K}_{e_3} + 6 \log X_H + 2 \log T$. Here X_H is the equilibrium concentration of the hydrogen ions, T is the concentration of

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the free TBP in the organic phase, D the distribution factor. The following independent variables were chosen for programming: $X_1 = \log_2 X_H - 1.5$ and $X_2 = 2(\log_2 T + 2.5)$. The dependent variable is $y = \log_2 D$. The regression equation $y = -4.2230 + 3.609236X_1 + 0.7768862X_2 + 0.7814312X_1^2 + 0.5988127X_2^2 + 0.000725X_1X_2$. The extraction was performed using TBP diluted with xylene. The distribution was examined with $1 \cdot 10^{-5}$ mole/l Zr^{95}. The value of X_H was varied from 1.053 to 7.50 and that of T from 0.108 to 0.250. The center of the experiment was close to $X_H = 2.83$, T = 0.177.

Results: None of the three reaction equations describes the extraction process correctly. The data obtained from the regression equation do not agree with the experimental ones. Sidereactions, as e.g. the formation of different solvates and complexes (such as the complex $H_{n-2}ZrO(NO_3)_n$) are likely to occur. Nevertheless the regression equation can be used to estimate D. Here the error is four times the experimental error. There are 2 tables.

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S/032/63/029/003/012/020
Application of mathematical experimental... B101/B186

ASSOCIATION: Moskovskiy gosudarstvennyy universitet (Moscow State University); Gosudarstvennyy nauchno-issledovatel'skiy i proyektnyy institut redkometallicheskoy promyshlennosti (State Design and Planning Scientific Research Institute of the Rare Metals Industry)

Card 3/3

GRANOVSKIY, Yu.V.; ADLER, Yu.P.; NALIMOV, V.V.; KOMISSAROVA, L.N.

Screening experiments in the study of separation of zirconium and hafnium by extraction with tributyl phosphate. Zav. lab. 29 no.10:1220 '63. (MIRA 16:12)

1. Moskovskiy gosudarstvennyy universitet i Gosudarstvennyy nauchno-issledovatel'skiy i proyektnyy institut redkometallicheskoy promyshlennosti.

SPITSYN, Vikt.I.; GRANOVSKIY, Yu.V.; KOMISSAROVA, L.N.; BORISOVA, A.P.; SAVICH, I.A.

Spectrophotometric study of the process of complex formation by the Box-Wilson method. Vest. Mosk. un. Ser. 2: Khim. 20 no.2:50-53 Mr-Ap '65. (MIRA 18:7)

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Using the Sow - Wilson method for selecting the optimum conditions of electrodeposition. Zashch.met. 1 no.6 716-718 N-D '65. (MIRA 19:1)

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1. Moskovskiy gosudarstvennyy universitet imeni M.V.Lomonosova, kafedra neorganicheskoy khimii. Submitted March 27, 1965.

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Organize the planning of expenses in servicing Moskvich van trucks. Avt.transp. 33 no.12:8 D '55. (MLRA 9:3)

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(Motortrucks--Repairing)

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[What the tool maker should read to improve his qualifications; a bibliography] Chto chitat' slesariu-instrumental'shchiku dlia povysheniia kvalifikatsii; rekomendatel'nyi ukazatel' literatury. Pod red. N.I.Dumchenko. Leningrad, Gos. publichnaia biblioteka im. M.E.Saltykova-Shchedrina, 1956. 54 p. (MLRA 9:11)
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GRANSKIY, Viktor Isidorovich; DUMCHENKO, N.I., redaktor

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